CLAIMS:

1. A collector for a projection exposure apparatus which is operated in a scanning mode along a scanning direction with a wavelength ≤ 193 nm, preferably ≤ 126 nm, more preferably with wavelengths in the extreme UV region, with the collector receiving light from a light source on the object side and illuminating a region in a plane on the image side which is defined by a local coordinate system, with the y-direction of the local coordinate system being parallel to the scanning direction and the x-direction being perpendicular to the scanning direction,
the collector comprising:
at least a first mirror shell and a second mirror shell, which are essentially rotational symmetric about a common rotational axis, said first mirror shell and said second mirror shell being arranged within each other about said common rotational axis;
fastening devices for fastening said first mirror shell and said second mirror shell, wherein said fastening devices have support spokes which extend in a radial direction of said first and said second mirror shell, wherein said support spokes are arranged in such a way that when they are projected into said plane on the image side they are inclined relative to the y-direction of the local coordinate system in said plane.

2. A collector according to claim 1, wherein said first mirror shell and said second mirror shell comprise at least a mirror segment (1007.1, 1007.2) having a first optical surface area.

3. A collector as claimed in claim 1, wherein at least one of said support spokes have a shape tapering in a radial direction towards said common rotational axis.

4. A collector as claimed in claim 1, wherein said support spokes comprise grooves into which said first mirror shell and said second mirror shell are

embedded.

5. A collector as claimed in claim 1, wherein said support spoke taper in a direction of said common rotational axis towards said plane on the image side.

6. A collector as claimed in claim 1, wherein said collector comprises a plurality of spokes and wherein at least one spoke of said plurality of spokes extend parallel to a local x-direction in said plane on the image side when said plurality of spokes are projected into said plane to be illuminated on the image side.

7. A collector for a projection exposure apparatus comprising
at least a first mirror shell and
at least a second mirror shell
being arranged within each other about a common rotational axis,
said first mirror shell and said second mirror shell are fastened by a fastening device having a support spoke,
wherein said support spoke is of a material with a thermal expansion coefficient which provides a
essentially rotational symmetric expansion of said first mirror shell and said second mirror shell under thermal load.

8. The collector of claim 6, wherein said collector has a cooling and/or a heating device, wherein said cooling and/or heating device provides for a essentially equal deformation in shape of said first mirror shell and said second mirror shell

9. The collector of claim 6, wherein said support spoke is made of materials with different thermal expansion coefficients.

10. A collector for a projection exposure apparatus
comprising

at least a first mirror shell and at least a second mirror shell being arranged within each other about a common rotational axis
said first mirror shell and said second mirror shell are fastened by a fastening device having a support spoke,
wherein said support spoke is of a material with a thermal expansion coefficient,
which provides for a essentially equal deformation in shape of said first mirror shell and said second mirror shell.

11. A collector for a projection exposure apparatus, which is operated in a scanning mode along a scanning direction with wavelengths $\leq$ 193 nm, with the collector receiving light from a light source on an object-side and illuminating a field in a field plane on an image side,
wherein said collector comprises at least a first mirror shell and at least a second mirror shell,
and wherein the transmission of light from said object-side to said image side is different for said at least first mirror shell and said at least second mirror shell.

12. The collector of claim 11 wherein said at least first mirror shell comprises a first coating and said at least second mirror shell comprises a second coating and said first coating is different from said second coating.

13. The collector of claim 11 wherein said collector further comprises a filter element situated on said object-side;
said filter element has a first transmission of light entering said first mirror shell and a second transmission for light entering said second mirror shell and said first transmission is different from said second transmission.

14.The collector of claim 11 wherein said collector further comprises a filter element situated on said image side;
said filter element has a first transmission for light emerging from said mirror shell and a second transmission for light emerging from said second mirror shell and said first transmission is different from said second transmission.

15. A collector for a projection exposure apparatus comprising
mirror shell said mirror shell is fastened by a fastening device said fastening device fastens said mirror shell at an isothermal point of fixation.

16. A collector for a projection exposure apparatus comprising at mirror shell having a rigidity $C_{\text{mirror shell}}$ said mirror shell is fastened by a fastening device having a fastening part via a connection said connection has a rigidity $C_{\text{fastening part-mirror shell}}$ and wherein said connection is choosen such that the following inequality holds true:
$C_{\text{fastening part-mirror shell}} < C_{\text{mirror shell}}$

17. A collector for a projection exposure apparatus comprising a mirror shell being rotational symmetric around an axis said mirror shell is fastened by a fastening device wherein said fastening device has at least a active component which provides for a essentially ring shaped form of said mirror shell if the temperature changes.

18. An illumination system for a projection exposure system which is operated in a scanning mode along a scanning direction with a wavelength ≤ 193 nm, preferably ≤ 126 nm, more preferably with wavelengths in the extreme UV region, for illuminating a field in a field plane, with said field having an extension parallel to the scanning direction and an extension perpendicular to the scanning direction, wherein the collector is a collector according to one of the claims 1 to 17 and the illumination system comprises at least a first optical element with raster elements which is arranged in said plane to

be illuminated on the image side.

19. An illumination system as claimed in claim 18, wherein a support spoke which does not extend parallel to the local x-direction when projected into the plane in which the first optical element with first raster elements is arranged in such a way that its projection into said plane intersects the plurality of said first raster elements of said first optical element at different locations on the first raster elements..

20. An EUV projection exposure system with
20.1 an illumination system according to claim 19;
20.2 a mask which is illuminated by the illumination system;
20.3 a projection lens for projecting the mask onto
20.4 a light-sensitive object.

21. A method for producing microelectronic components, especially semiconductor components, with an EUV projection exposure system according to claim 20.